Osoyoos Lake – Studies 2 & 3
Study 2- Criteria to Declare Drought
Study 3 – Summer and Winter Operation

Presentation to the
International Osoyoos Lake Board of Control and
The Osoyoos Lake Water Science Forum
September 19, 2011
Osoyoos BC

URBANSYSTEMS

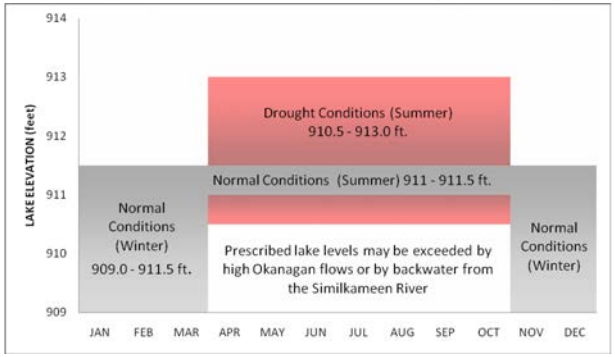
Outline

1. Project background
2. Study 2 – Evaluation of criteria to declare drought
3. Study 3 – Review of dates for summer and winter operation
4. Conclusions
5. Recommendations

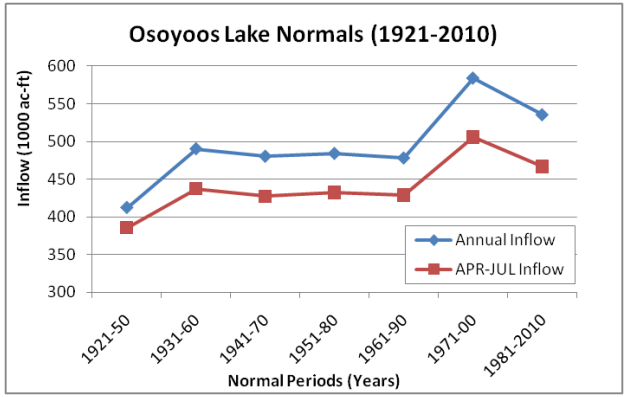
Project Background

- IJC Osoyoos Lake Orders of Approval terminate on February 22, 2013
- Washington State intends to apply for renewal of the Orders
- Context for Studies 2 and 3

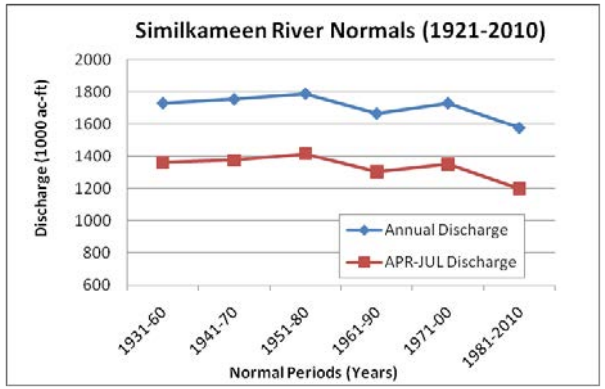
Study 2 - Understanding Drought



Current Drought Indices



Current Drought Indices



Drought Indices

Drought Indices	Pros	Cons	Who uses it
Percent of Normal	Single region or season	Easily misunderstood	Worldwide
Palmer Drought Severity Index	Comprehensive drought index	Not for large topographic variations	United States
Crop Moisture Index	Identifies potential agricultural droughts	Not good for long-term modeling	United States Department of Agriculture
Surface Water Supply Index	Water supply by basin	Limits inter-basin comparisons	Colorado
Standardized Precipitation Index	Less complex than Palmer	Long time period database	India
Reclamation Drought Index	Includes temperature and evaporation	Inter-basin comparisons are difficult	Oklahoma
Deciles	Accurate assessment of precipitation	Requires long data record	Australia
Effective Drought Index	Uses daily precipitation	Not widely used	Korea
Streamflow Drought Index	Simple and effective	Not widely used	Greece
Reconnaissance Drought Index	Monthly, seasonal or annual calculations	Suitable data	Greece

Drought Conclusions

- Current indices not bad
- Other indices not supported
- Do we need to declare drought?
- Data is not available to support other indices
- Maybe the reservoir could be managed differently

Study 2 – Evaluation of criteria to declare drought

- In the existing Orders of Approval, drought conditions are declared when any one of three criteria is met:

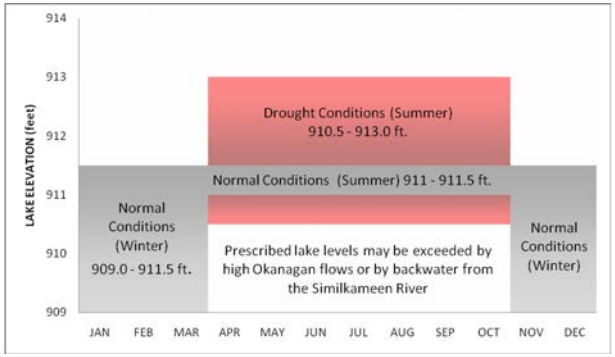
  (a) the volume of flow in the Similkameen River at Nighthawk, Washington for the period April through July as calculated or forecasted by United States authorities is less than 1.0 million acre-feet or

  (b) the net inflow to Okanagan Lake for the period April through July as calculated or forecasted by Canadian authorities is less than 195,000 acre-feet or

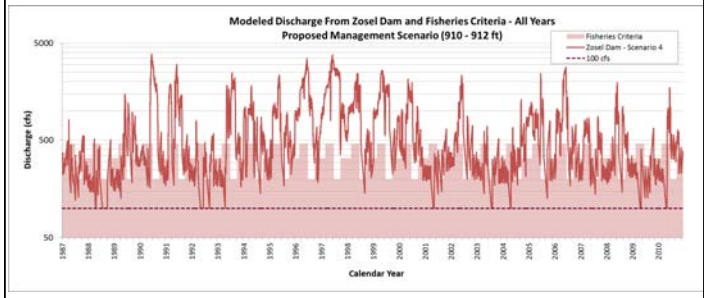
  (c) the level of Okanagan Lake fails to or is forecasted by Canadian authorities to fail to reach during June or July elevation 1122.8 feet Canadian Geodetic Survey Datum.

- Drought conditions are terminated when updated forecasts or actual conditions indicate none of these criteria are met.
- Currently a drought is declared regardless of whether only one or all three of the criteria are met and regardless of the degree to which those criteria are satisfied.

Study 3 - Current Summer and Winter Operations



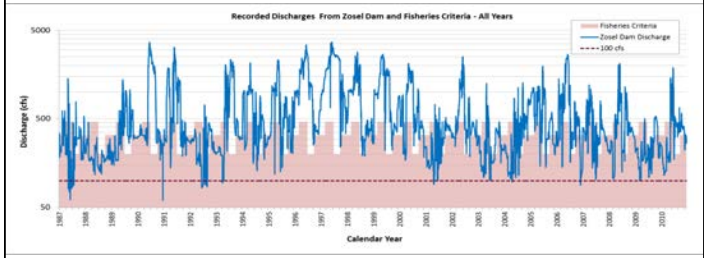
Downstream Fisheries Criteria



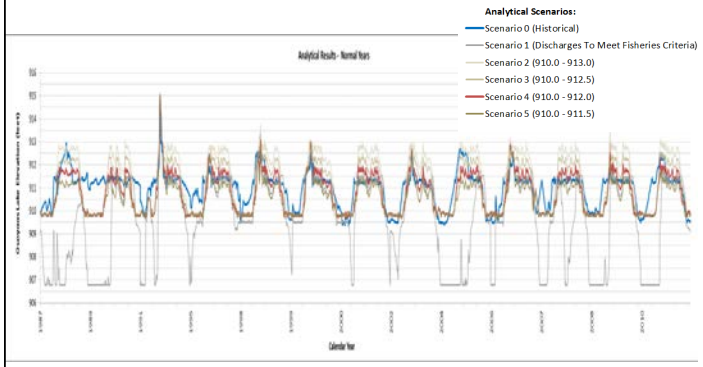
Downstream Fisheries Criteria

1	2	3
Month	Fisheries Criteria (Ecology 1990) (cfs)	Instream Flow Criteria (WAC 1988) (cfs)
January	331	320
February	331	320
March	459	320
April	459	330
May	459	350
June	459	500
July	200	420
August	200	320
September	200	300
October	331	330
November	331	370
December	331	320

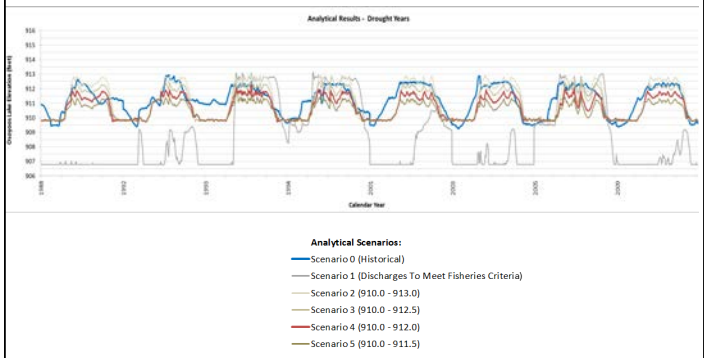
Historical Operations



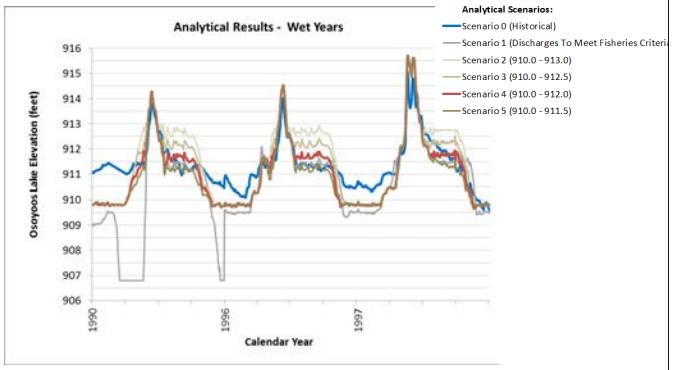
Modeling Normal Years



Modeling Drought Years



Modeling Wet Years



Proposed Alternative Management Plan